Advanced Image Processing (IT507)

Assignment 1

January 25, 2021

1 Instructions

- Form a group (no more than 2 persons in group).
- Send the group details to the course instructor.
- Implement the following problems in Python or MATLAB.
- **Do not copy code from any source.**
- Prepare a report containing the "Objective, Method, Experiments, Conclusion" (one report per group).
- Submit the report (PDF format) in the Google Classroom within the deadline.
- The assignments will be evaluated on Monday (`https://meet.google.com/lookup/ee64ld2dc3`) from 4:30 PM to 6:30 PM.

2 Problems

1. Up-sample and down-sample the the image of Figure 1 by scale factor 4. Discuss the effect of changing sampling rate. Also observe the effect of different quantization levels ($L = 2, 4, 8, 16, 32, 64, 128, 256$) for this image. (Figure 1 image : fig1.jpg)

Figure 1

2. Compute the mean and variance of the Figure 2. Compute the same parameters for Figure 1. Then add additive white Gaussian noise of mean 0 and standard deviation 20 to both the images and compute the means and variances. Explain your observations. Further, generate several such noisy images from Figure 1 and average all of them. Does the averaged image has less noisy artifact? (Figure 2 image: baboon.jpg)

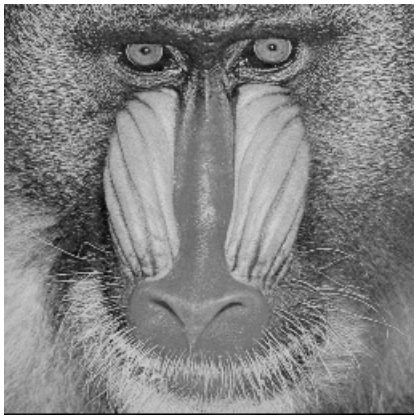

Figure 2

3. Find out the number of objects from the Figure 3. Label distinct objects with distinct colors. [Use the algorithm of finding out connected components.] (Figure 3 image: cc.jpg)

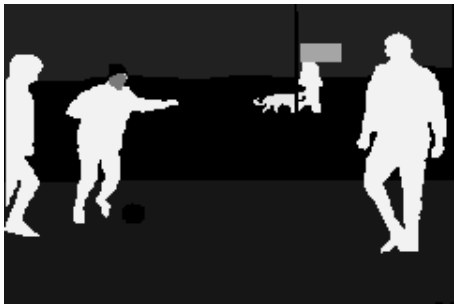

Figure 3